

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

Paper No. 23

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte YONG CAO

Appeal No. 2000-0747
Application 08/872,657

ON BRIEF

Before HAIRSTON, KRASS, and FLEMING, **Administrative Patent Judges.**

FLEMING, **Administrative Patent Judge.**

DECISION ON APPEAL

This is decision on an appeal from the final rejection of claims 1, 3, 5, 7, 9, 10, 12, 14, 16 and 18 to 92, all the claims pending in the present application. Claims 2, 4, 6, 8, 11, 13, 15 and 17 have been cancelled.

The invention relates to polymer LEDs which have a transparent hole-injecting anode layer, an emissive layer and an electron-injecting cathode layer wherein the

cathode layer has an ultra-thin layer of alkaline earth metal having a thickness of about 15 to about 100 D.

The independent claim 1 is reproduced as follows:

1. A polymer light-emitting diode comprising:

- (a) a transparent hole-injecting anode layer;
- (b) an emissive layer comprising an electroluminescent polymer; and
- (c) an electron-injecting cathode layer;

wherein said cathode layer comprises an ultra-thin layer of alkaline earth metal having a thickness of from about 30 to about 60 D.

The Examiner relies upon the following references:

Staring	5,705,888	Jan. 06, 1998
Biebuyck et al. (Biebuyck)	5,734,225	Mar. 31, 1998
Utsugi	5,747,930	May 05, 1998

Claims 1, 3, 5, 7, 9, 10, 12, 14, 16, 18 through 20, 22 through 24, 26 through 46, 48 through 55, 57 through 64, 66 through 92, 75 through 82 and 84 through 91 stand rejected under 35 U.S.C. § 103 as being unpatentable over Staring in view of Utsugi.

Claims 21, 25, 38, 47, 56, 65, 74, 83 and 92 stand rejected under 35 U.S.C. § 103 as being unpatentable over Staring in view of Utsugi and further in view of Biebuyck.

Rather than reiterate the arguments of Appellant and the Examiner, reference is made to the briefs¹ and answer for the respective details thereof.

OPINION

We will not sustain the rejection of claims 1, 3, 5, 7, 9, 10, 12, 14, 16 and 18 through 92 under 35 U.S.C. § 103.

In rejecting claims under 35 U.S.C. § 103, the Examiner bears the initial burden of establishing a ***prima facie*** case of obviousness. ***In re Oetiker***, 977 F.2d 1443, 1445, 24 USPQ 1443, 1444 (Fed Cir. 1992). See also ***In re Piasecki***, 745 F.2d 1468, 1472, 223 USPQ 785, 788 (Fed Cir. 1984). The Examiner can satisfy this burden by showing that some objective teaching in the prior art or knowledge generally available to one of ordinary skill in the art suggests the claimed subject matter. ***In re Fine***, 837 F.2d 1071, 1074, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). Only if this initial burden is met does the burden of coming forward with evidence or argument shift to the Appellants. ***Oetiker***, 977 F.2d at 1445, 24 USPQ at 1444. ***See also Piasecki***, 745 F.2d at 1472, 223 USPQ at 788.

An obviousness analysis commences with a review and consideration of all the pertinent evidence and arguments. "In reviewing the [E]xaminer's decision on appeal, the Board must necessarily weigh all of the evidence and arguments." ***In re Oetiker***, 977

¹Appellant filed an appeal brief on June 7, 1999. Appellant filed a reply brief on August 26, 1999. The Examiner mailed an Office Communication on November 18, 1999 stating that the reply brief had been entered and considered but no further response by the Examiner is deemed necessary.

F.2d at 1445, 24 USPQ2d at 1444. [T]he Board must not only assure that the requisite findings are made, based on evidence of record, but must also explain the reasoning by which the findings are deemed to support the agency's conclusion." ***In re Lee***, Slip OP 00-1158, page 9. With these principles in mind, we commence review of the pertinent evidence and arguments of Appellant and Examiner.

On pages 8 through 11 of the brief, Appellant argue that the Examiner has provided no basis for combining Staring with Utsugi. Appellant argues that Staring does not suggest or teach an electron-injecting cathode layer having an ultra-thin layer of alkaline earth metal as set forth in Appellant's claims. Appellant further points out that Utsugi does not teach or suggest an electron-injecting cathode layer employing an alkaline earth metal, but instead teaches other materials.

On page 3 of the Examiner's answer, the Examiner admits that Staring does not show an electron-injecting cathode layer having a thickness of from 15 to 85 D. The Examiner points out that Utsugi does teach an electron-injecting cathode layer of another material having a thickness of 10 to 300 D. The Examiner does not provide any evidence or factual finding as to reasons why one of ordinary skill in the art would modify the Staring electron-injecting cathode layer by providing an ultra thin layer in the

range of thickness as claimed by the Appellant. The Examiner simply concludes that it

would have been obvious for one of ordinary skill in the art at the time the invention was made to use 10 to 300 D thickness to keep the overall thickness from being unnecessarily thick. See pages 3 and 4 of the Examiner's answer.

The Federal Circuit states that "[t]he mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification." ***In re Fritch***, 972 F.2d 1260, 1266 n.14, 23 USPQ2d 1780, 1783-84 n.14 (Fed. Cir. 1992), citing ***In re Gordon***, 733 F.2d 900, 902, 221 USPQ 1125, 1127 (Fed. Cir. 1984). It is further established that "[s]uch a suggestion may come from the nature of the problem to be solved, leading inventors to look to references relating to possible solutions to that problem." ***Pro-Mold & Tool Co. v. Great Lakes Plastics, Inc.***, 75 F.3d 1568, 1573, 37 USPQ2d 1626, 1630 (Fed. Cir. 1996), citing ***In re Rinehart***, 531 F.2d 1048, 1054, 189 USPQ 143, 149 (CCPA 1976)(considering the problem to be solved in a determination of obviousness). The Federal Circuit reasons in ***Para-Ordnance Mfg. Inc. v. SGS Importers Int'l Inc.***, 73 F.3d 1085, 1088-89, 37 USPQ2d 1237, 1239-40 (Fed. Cir. 1995), that for the determination of obviousness, the court must answer whether one of ordinary skill in the art who sets out to solve the problem and who had before him in his

workshop the prior art, would have been reasonably expected to use the solution that is

claimed by the Appellants.

In addition, our reviewing court requires the PTO to make specific findings on a suggestion to combine prior art references. *In re Dembiczak*, 175 F.3d 994, 1000-01, 50 USPQ2d 1614, 1617-19 (Fed. Cir. 1999). Our reviewing court states further that the "factual question of motivation is material to patentability, and could not be resolved on subjective belief and unknown authority." *In re Lee*, Slip OP 00-1158, page 9. It is improper, in determining whether a person of ordinary skill would have been led to this combination of references, simply to [use] that which the inventor taught against its teacher." *W.L. Gore v. Garlock, Inc.*, 721 F.2d 1540, 1553, 220 USPQ 303, 312-13 (Fed. Cir. 1983).

By our careful review of the record before us, we fail to find that the Examiner has fulfilled the burden of showing a factual finding of a suggestion to modify the Staring electron-injecting cathode having a thickness in the range of 100 to 5000 D to an ultra-thin layer in the ranges set forth in Appellant's claims. We appreciate that Utsugi does teach an electron-injecting cathode layer having a thickness in the ranges claimed by the Appellant. However, Utsugi teaches that the electron-injecting cathode layer is made of a completely different material than the claimed alkaline earth metal in

the Appellant's claims. The Examiner has not come to grips with why one of ordinary skill

in the art would look to this Utsugi teaching of a material having completely different characteristics and simply be led to use an ultra-thin layer of alkaline-earth metal. We are only left with the Examiner's conclusion without a finding of fact on which to base that conclusion.

The Examiner's conclusion for reasons and suggestions of combinability are further paleed by the fact that Appellant's disclosure shows that he has discovered unexpected results not known in the prior art. In particular, we point to figures 2, 3 and 4 which are graphs of luminance versus time for LED devices with different thicknesses of calcium layers, barium layers and strontium layers respectively. On page 14 of the specification, Appellant shows that by comparing the data in Figures 2, 3 and 4, it is evident that the cathodes comprising an ultra-thin layer provide the best stress life compared to other cathodes. Appellant argues in the reply brief that this showing of extended stress lifetime, which is an unexpected result for the ultra-thin thickness of the cathode layer, has not been properly evaluated by the Examiner. We agree.

We further note that the additional reference, Biebuyck does not provide any further factual evidence to show reasons why one of ordinary skill in the art would make

the proposed modification. Therefore, we will not sustain the rejection of claims 1, 3, 5, 7,

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9, 10, 12, 14, 16 and 18 through 92 under 35 U.S.C. § 103. Accordingly, the Examiner's decision is reversed.

REVERSED

KENNETH W. HAIRSTON
Administrative Patent Judge

ERROL A. KRASS
Administrative Patent Judge

MICHAEL R. FLEMING
Administrative Patent Judge

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